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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/938,492
Filing Date: August 27, 2001
Appellant(s): MEHIGAN, MICHAEL

Donald R. Studebaker
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 12 January 2007 appealing from the Office action mailed 12 July 2006.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is incorrect, but not substantially so. The rejection of 12 July 2006 is a non-final rejection, but there have been no amendments filed afterwards.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

4,998,122	KANNO	3-1991
5,438,431	OSTROMOUKHOV	8-1995
5,153,576	HARRINGTON	11-1992
6,034,782	HINES	3-2000

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1, 8, 10 and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kanno (US Patent 4,998,122) in view of Ostromoukhov (US Patent 5,438,431).

Regarding claims 1 and 10: Kanno discloses detecting a predetermined property of a line-like part (figure 9(A,B,C) of Kanno) of the halftone image (column 4, lines 15-20 of Kanno); and processing the line-like part of the halftone image by a first dithering technique (column 5, lines 3-6 and lines 21-27 of Kanno) or a second dithering technique (column 9, lines 36-43 of Kanno) according to the predetermined property of the line-like part (column 4, lines 19-22 of Kanno), wherein the predetermined property includes both the thickness and the density of the line-like parts (column 5, lines 25-27 of Kanno) so that when the line-like part is of a thickness smaller than a first threshold value (column 9, lines 39-43 of Kanno) and at the same time of a density higher than a second threshold value (column 4, lines 3-7 and lines 15-22 of Kanno), the part is processed by the second dithering technique (column 9, lines 36-43 of Kanno) and otherwise the part is processed by the first dithering technique (column 5, lines 21-27 of Kanno). If the line-like part is bold (column 5, lines 25-27 of Kanno), then said line-like part clearly has greater thickness than if said line-like part is not bold. If the line-like part is a character, then the line-like part is thicker than a photograph region and a low-contrast region (column 4, lines 3-7 and lines 15-22 of Kanno). The point at which the method taught by Kanno considers the line-like part to be bold is the first thickness threshold and the point at which the method taught by Kanno considers the line-like part to be a character (and not a bold character or low-contrast character) is the second thickness threshold.

Kanno does not disclose expressly that said halftone image is a halftone color image; that said first dithering technique is a clustered dot dithering technique; and that said second dithering technique is a dispersed dot dithering technique.

Ostromoukhov discloses, as part of the discussion of the prior art, a halftone color image (column 1, lines 16-23 of Ostromoukhov); a clustered dot dither technique (figure 3 and column 1, line 63 to column 2, line 4 of Ostromoukhov); and a dispersed dot dithering technique (figure 4 and column 1, lines 40-47 of Ostromoukhov). Clustered dot dithering does not render the smaller image details very well (figure 1 and column 2, lines 4-7 of Ostromoukhov) and dispersed dot dithering is better for rendering the smaller image details (column 1, lines 45-47 of Ostromoukhov), but can have certain banding artifacts (figure 2 and column 1, lines 50-54 of Ostromoukhov).

Kanno and Ostromoukhov are combinable because they are from the same field of endeavor, namely digital image data dithering and processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to be able to select between at least two dithering techniques, as taught by Kanno, wherein said first dithering technique taught by Kanno is the clustered dot dithering technique taught by Ostromoukhov, and wherein said second dithering technique taught by Kanno is the dispersed dot dithering technique taught by Ostromoukhov. The clustered dot dithering technique has advantages for a particular type of image data, specifically image data that only requires a restricted number of grayscale levels (column 1, line 63 to column 2, line 4 of Ostromoukhov), such as text, line data, and the like. While the clustered dot dithering technique does not render small image details well (column 2, lines 4-7 of Ostromoukhov), the dispersed dot dithering technique does render small image details well (column 1, lines 45-47 of Ostromoukhov). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the system taught by Kanno to switch between the clustered dot and dispersed dot dithering techniques taught by Ostromoukhov, depending upon the type of image data encountered. The motivation for doing so would have been that

the different dithering techniques provide good results, along with some associated artifacts, for different types of image data (column 1, lines 45-47 and lines 50-54; and column 2, lines 4-7 of Ostromoukhov). Further, at the time of the invention, it would have been obvious to a person of ordinary skill in the art to perform the image processing method on a color image, as taught by Ostromoukhov. The suggestion for doing so would have been that each color plane can be processed as an individual halftone image (column 1, lines 16-23 of Ostromoukhov). Therefore, it would have been obvious to combine Ostromoukhov with Kanno to obtain the invention as specified in claims 1 and 10.

Further regarding claim 10: Kanno teaches using a recording medium in which a program for carrying out the method is recorded (column 4, line 66 to column 5, line 2 and column 8, lines 28-33 of Kanno).

Regarding claim 8: Kanno discloses an apparatus (figure 1 of Kanno) comprising a selecting means (figure 1(9) of Kanno) which selects a first dithering technique (column 5, lines 3-6 and lines 21-27 of Kanno) or a second dithering technique (column 9, lines 36-43 of Kanno) according to the predetermined property of a line-like part (figure 9(A,B,C) of Kanno) of the halftone image (column 4, lines 15-22 of Kanno); and a processing part (figure 1(10) of Kanno) which processes the line-like part of the halftone image by the technique selected by the selection means (column 5, lines 17-19 of Kanno).

Kanno does not disclose expressly that said halftone image is a halftone color image; that said first dithering technique is a clustered dot dithering technique; and that said second dithering technique is a dispersed dot dithering technique.

Ostromoukhov discloses, as part of the discussion of the prior art, a halftone color image (column 1, lines 16-23 of Ostromoukhov); a clustered dot dither technique (figure 3 and column 1, line 63 to column 2, line 4 of Ostromoukhov); and a dispersed dot dithering technique (figure 4 and column 1, lines 40-47 of Ostromoukhov). Clustered dot dithering does not render the smaller image details very well (figure 1 and column 2, lines 4-7 of Ostromoukhov) and dispersed dot dithering is better for rendering the

smaller image details (column 1, lines 45-47 of Ostromoukhov), but can have certain banding artifacts (figure 2 and column 1, lines 50-54 of Ostromoukhov).

Kanno and Ostromoukhov are combinable because they are from the same field of endeavor, namely digital image data dithering and processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to be able to select between at least two dithering techniques, as taught by Kanno, wherein said first dithering technique taught by Kanno is the clustered dot dithering technique taught by Ostromoukhov, and wherein said second dithering technique taught by Kanno is the dispersed dot dithering technique taught by Ostromoukhov. The clustered dot dithering technique has advantages for a particular type of image data, specifically image data that only requires a restricted number of grayscale levels (column 1, line 63 to column 2, line 4 of Ostromoukhov), such as text, line data, and the like. While the clustered dot dithering technique does not render small image details well (column 2, lines 4-7 of Ostromoukhov), the dispersed dot dithering technique does render small image details well (column 1, lines 45-47 of Ostromoukhov). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the system taught by Kanno to switch between the clustered dot and dispersed dot dithering techniques taught by Ostromoukhov, depending upon the type of image data encountered. The motivation for doing so would have been that the different dithering techniques provide good results, along with some associated artifacts, for different types of image data (column 1, lines 45-47 and lines 50-54; and column 2, lines 4-7 of Ostromoukhov). Further, at the time of the invention, it would have been obvious to a person of ordinary skill in the art to perform the image processing method on a color image, as taught by Ostromoukhov. The suggestion for doing so would have been that each color plane can be processed as an individual halftone image (column 1, lines 16-23 of Ostromoukhov). Therefore, it would have been obvious to combine Ostromoukhov with Kanno to obtain the invention as specified in claim 8.

Regarding claims 12, 13 and 14: Kanno discloses that said predetermined property includes both the thickness and the density of the line-like parts (figure 9(A-C) and column 6, lines 41-51 of Kanno) and detection of the line-like part of the image is carried out using attribute data received from software (column 5, lines 7-14 of Kanno). The specific image type is determined (column 6, lines 41-51 of Kanno), which includes character (figure 9(A) of Kanno), low-contrast character (figure 9(B) of Kanno), and bold character (figure 9(C) of Kanno). The difference between a bold character and a character is a difference between the thickness, since both a character and a bold character are completely black. The difference between a character and a low-contrast character is one of density since, in order to be low-contrast, a character must be of a grayscale value that is not completely black, and thus of a lower contrast with the background than either the character or bold character.

Claims 2-3, 7, 9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kanno (US Patent 4,998,122) in view of Ostromoukhov (US Patent 5,438,431) and Harrington (US Patent 5,153,576).

Regarding claims 2, 9 and 11: Kanno does not disclose expressly that the halftone color image is printed in monochrome by a printer which is not higher than 600 dpi in resolution.

Ostromoukhov discloses printing on a printer (column 1, lines 8-12 of Ostromoukhov) which is not higher than 600 dpi in resolution (column 2, lines 1-4 of Ostromoukhov).

Kanno and Ostromoukhov are combinable because they are from the same field of endeavor, namely digital image data dithering and processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to print on a medium resolution printer, as taught by Ostromoukhov. The motivation for doing so would have been that clustered dot dithering does not render

small details well (column 2, lines 4-7 of Ostromoukhov). Therefore, it would have been obvious to combine Ostromoukhov with Kanno.

Kanno in view of Ostromoukhov does not disclose expressly that the halftone color image is printed in monochrome.

Harrington discloses printing a halftone color image in monochrome (figure 2; column 2, lines 45-48 and column 4, lines 30-34 of Harrington).

Kanno in view of Ostromoukhov is combinable with Harrington because they are from the same field of endeavor, namely digital image data dithering and processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to print the halftone color image taught by Ostromoukhov in monochrome, as taught by Harrington. The motivation for doing so would have been to be able to print on black-and-white printers, which are cheaper to print with (column 1, lines 16-20 of Harrington). Therefore, it would have been obvious to combine Harrington with Kanno in view of Ostromoukhov to obtain the invention as specified in claims 2, 9 and 11.

Regarding claim 3: Kanno discloses that the predetermined property is thickness of the line-like part (column 5, lines 25-27 of Kanno) so that when the line-like part is of a thickness larger than a threshold value, the part is processed by the first dithering technique (column 5, lines 21-27 of Kanno) and when the part is of a thickness not larger than the threshold value, the part is processed by the second dithering technique (column 9, lines 36-43 of Kanno). If the line-like part is bold (column 5, lines 25-27 of Kanno), then said line-like part clearly has greater thickness than if said line-like part is not bold. The point at which the method taught by Kanno considers the line-like part to be bold is the thickness threshold. Further, as discussed above in the arguments regarding claims 1 and 10, the first dithering technique is the clustered dot dithering technique and the second dithering technique is the dispersed dot dithering technique.

Regarding claim 7: Kanno discloses that two series of brush patterns are respectively prepared in advance for the first dithering technique and the second dithering technique (figure 3; column 4, line 66 to column 5, line 5; and column 9, lines 65-68 of Kanno), each series of brush patterns being prepared according to the density of the line-like part (column 4, lines 58-64 of Kanno), and the first dithering technique and the second dithering technique are carried out by the use of the brush patterns selected (column 4, lines 15-21 of Kanno) according to the density of the line-like part (column 4, lines 42-47 of Kanno). Dithering matrices (figure 3 of Kanno) are stored in memory for use (column 4, line 66 to column 5, line 5 of Kanno) depending upon the selection results (column 9, lines 65-68 of Kanno). Further, as discussed above in the arguments regarding claims 1 and 10, the first dithering technique is the clustered dot dithering technique and the second dithering technique is the dispersed dot dithering technique.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kanno (US Patent 4,998,122) in view of Ostromoukhov (US Patent 5,438,431), Harrington (US Patent 5,153,576), and obvious engineering design choice.

Regarding claim 4: Kanno in view of Ostromoukhov and Harrington does not disclose expressly that the threshold value is a value corresponding to 4 dots. However, 4 dots would clearly be one value which the line-like part could be considered bold. Some particular value must be selected as a threshold in order to operate the system taught by Kanno in view of Ostromoukhov and Harrington. Therefore, a threshold value of 4 dots is a mere engineering design choice.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kanno (US Patent 4,998,122) in view of Ostromoukhov (US Patent 5,438,431), Harrington (US Patent 5,153,576), and Hines (US Patent 6,034,782).

Regarding claim 6: Kanno in view of Ostromoukhov and Harrington does not disclose expressly that the method is carried out by a printer driver.

Hines discloses carrying out digital image data dithering using a printer driver (column 3, lines 23-27 of Hines).

Kanno in view of Ostromoukhov and Harrington is combinable with Hines because they are from the same field of endeavor, namely digital image data dithering and processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a printer driver to perform image data dithering, as taught by Hines, wherein the image data dithering method used is the method taught by Kanno in view of Ostromoukhov and Harrington. The motivation for doing so would have been that a printer driver is a typical piece of printing software that is used in dithering and halftoning images in a printing system. Therefore, it would have been obvious to combine Hines with Kanno in view of Ostromoukhov and Harrington to obtain the invention as specified in claim 6.

(10) Response to Argument

Regarding Appellant's Arguments with respect to Rejections under 35 USC §101 [pages 6-7 of Appeal Brief]:

Applicant's arguments with respect to the rejections of claims 10, 11 and 14 under 35 USC §101 have been fully considered and are persuasive. Therefore, **the rejections of claims 10, 11 and 14 under 35 USC §101 have been withdrawn.**

Regarding Appellant's Arguments with respect to Rejections of claims 1, 8, 10 and 12-14 under 35 USC §103(a) as being unpatentable over Kanno in view of Ostromoukhov [page 8, line 1 to page 13, line 10 of Appeal Brief]:

Firstly, on page 8 of the Appeal Brief, Appellant makes a general discussion of the requirements of a *prima facie* case of obviousness under 35 USC §103(a). Examiner does not dispute Appellant's discussion, except to point out that the motivation/suggestion to combine the applied prior art can come not merely from the prior art itself, but also from the nature of the problem to be solved and the knowledge of persons of ordinary skill in the art [see MPEP §2143.01].

Appellant argues that Kanno does not disclose a second dithering technique, as stated by Examiner in the rejection mailed 12 July 2006, since there is only one dithering technique taught by Kanno [see last paragraph of page 8 to page 11, line 12 of Appeal Brief].

Examiner replies that in Kanno, processing is performed based on the characteristics of the image [figure 9 and column 5, lines 3-6 of Kanno]. If the local region of the image data is determined to be bold character data, one type of binary encoding is performed upon the image data and selected for printed output [column 5, lines 21-27 of Kanno]. If the local region of the image data is determined to be normal character data, a different type of binary encoding is performed upon the image data and selected for printed output [column 9, lines 36-43 of Kanno]. Further, even if *arguendo* the first and second dithering techniques taught by Kanno are not different from each other (a point not admitted by Examiner), Examiner's rejection does not inherently require that the first dithering technique and second dithering technique necessarily be different from one another. In Kanno, there are two separate paths dithering can take based on the properties of the local image region, and thus there are two separate dithering techniques. While one may argue that they are the same technique, the techniques are still separate from one another and are thus two separate dithering techniques. Additionally, *by combination with Ostromoukhov*, the first and second dithering technique *are* different from each other since one (by

combination) becomes a clustered dot dithering technique and the other becomes a dispersed dot dithering technique. One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references [see *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986)]. Finally, recited claims 1 and 8 do not recite "a first dithering technique" and "a second dithering technique", but instead recite "a clustered-dot dithering technique" and "a dispersed dot dithering technique", which is taught by the combination of Kanno and Ostromoukhov.

Appellant argues that Kanno does not teach detecting a predetermined property of a line-like part of a halftone color image, and processing the line-like part of the halftone color image by a clustered dot dithering technique or a dispersed dot dithering technique according to the detected predetermined property of the line-like part of the halftone color image [see page 11, lines 14-24 of Appeal Brief].

Examiner replies that, while Kanno does not by itself teach the full recitation of claims 1 and 8, the combination of Kanno and Ostromoukhov does fully teach claims 1 and 8, as set forth in the Office action mailed 12 July 2006. Again, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references [see *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986)].

Appellant argues that **(a)** there is no suggestion or motivation to combine the teachings of Ostromoukhov found in the Background of the reference with Kanno; **(b)** that Ostromoukhov does not address the issues and solutions of Appellant's invention; and **(c)** that neither Ostromoukhov nor Kanno teach the determination of the condition that affects the selection of the cluster dot dithering or the dispersed dot dithering technique [see page 11, line 26 to page 13, line 10 of Appeal Brief].

Examiner replies that, with respect to **(a)** and **(c)**, patents are relevant as prior art for all they contain [see MPEP §2123]. This includes what is discussed in the Background. Examiner has not at all relied upon the actual embodiments of the disclosed invention set forth in Ostromoukhov, but rather upon

the discussion of the state of the art in the Background of Ostromoukhov. Ostromoukhov does provide one of ordinary skill in the art at the time of the invention adequate motivation to combine the teaching of Ostromoukhov set forth in the Office action mailed 12 July 2006 with the overall system taught by Kanno. The proper application of the clustered dot and dispersed dot dithering techniques, along with the reasons why one of ordinary skill in the art at the time of the invention would use each technique, are described in Ostromoukhov and directly relate to what is taught by Kanno. Kanno teaches halftoning the image data according to the predetermined property of the image data [figure 9 and column 4, lines 3-22 of Kanno]. Ostromoukhov teaches that clustered dot dithering does not render the smaller image details very well [figure 1 and column 2, lines 4-7 of Ostromoukhov] and dispersed dot dithering is better for rendering the smaller image details [column 1, lines 45-47 of Ostromoukhov], but can have certain banding artifacts [figure 2 and column 1, lines 50-54 of Ostromoukhov]. Clustered-dot dithering is taught by Ostromoukhov to be advantageous for a restricted number of gray levels [column 2, lines 1-7 of Ostromoukhov] and dispersed-dot dithering is taught by Ostromoukhov to be advantageous for fine details [column 1, lines 45-47 of Ostromoukhov]. Since Kanno already teaches that different types of processing is selected based on the image data type, and Ostromoukhov teaches the uses of clustered-dot dithering and dispersed-dot dithering for different types of image data, then clearly Ostromoukhov would have motivated one of ordinary skill in the art at the time of the invention to select between different types of image data rendering, as taught by Kanno, the rendering techniques being clustered-dot dithering and dispersed-dot dithering, each operating based on the type of image data to which they are best suited, as set forth by Ostromoukhov.

Finally, with respect to argument **(b)**, Examiner has shown that each and every limitation of claims 1 and 8 are taught by the combination of Kanno and Ostromoukhov. Furthermore, as stated above, Ostromoukhov has been relied upon for the teachings set forth in the Background of the reference, and has not been relied upon for the actual disclosed invention set forth in the reference. Additionally, while

Appellant may have had a different purpose in mind when devising the system and method disclosed in the present application, the specifically recited claims are rendered obvious by the combination of reference applied in the Office action of 12 July 2006.

Regarding Appellant's Arguments with respect to Rejections of claims 2-3, 7, 9 and 11 under 35 USC §103(a) as being unpatentable over Kanno in view of Ostromoukhov and Harrington [page 13, line 12 to end of page 13 of Appeal Brief]:

Since claims 1 and 8 have been demonstrated by Examiner to be rendered obvious to one of ordinary skill in the art at the time of the invention, claims 2-3, 7, 9 and 11 cannot be considered patentable merely due to their respective dependencies.

Regarding Appellant's Arguments with respect to Rejections of claim 4 under 35 USC §103(a) as being unpatentable over Kanno in view of Ostromoukhov, Harrington and obvious engineering design choice [page 14, line 1 to page 14, line 18 of Appeal Brief]:

Claim 4 incorporates all of the limitations specifically recited in claims 1-3, due to the chain of dependency from claim 1 to claim 4. Claim 2, which is rejected over the combination of Kanno in view of Ostromoukhov and Harrington, recites that the printer has a resolution not higher than 600 dpi. Claim 3 recites that thickness is the predetermined property of the line-like part and that the selection of dithering technique is based on a threshold value of thickness. In the context of the combination set for in rejecting claim 3 (Kanno in view of Ostromoukhov and Harrington), the "threshold" recited in claim 4 is a threshold above which the line-like part of the image would be considered "bold". For a printer with a resolution not higher than 600 dpi, four dots would be a reasonable threshold to set for considering a line-like part to be bold. An artisan must set the threshold already taught by the combination of Kanno in view of Ostromoukhov and Harrington to something in order for the system to work. A setting of four

dots is a reasonable setting for a printer with a resolution not higher than 600 dpi and would thus be a simple matter of engineering design choice for the artisan designing the system which performs the method recited in claim 4.

Regarding Appellant's Arguments with respect to Rejections of claim 6 under 35 USC §103(a) as being unpatentable over Kanno in view of Ostromoukhov, Harrington and Hines [page 14, line 20 to page 15, line 2 of Appeal Brief]:

Since claim 1 has been demonstrated by Examiner to be rendered obvious to one of ordinary skill in the art at the time of the invention, claim 6 cannot be considered patentable merely due to its dependency from claim 1.

CONCLUSION: Since Examiner has demonstrated that all claims are unpatentable for the reasons set forth in detail above, Examiner respectfully requests that the Board affirm Examiner's rejections set forth in the Office action mailed 12 July 2006.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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